

CLAIMS

1. Grain obtained from a rice plant, comprising starch, wherein the proportion of amylose in the starch of the grain is at least 40%.
- 5 2. The grain of claim 1, comprising two or more genetic variations, wherein one genetic variation is selected from the group consisting of
 - a) a mutation of an *SBEIIa* gene which inhibits *SBEIIa* expression and/or activity, and
 - b) an introduced nucleic acid which inhibits *SBEIIa* expression and/or activity,
 - 10 andand wherein a second genetic variation is selected from the group consisting of
 - c) a mutation of an *SBEIIb* gene which inhibits *SBEIIb* expression and/or activity, and
 - d) an introduced nucleic acid which inhibits *SBEIIb* expression and/or activity.
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3. The grain of claim 1 or 2, comprising reduced levels of *SBEIIa* and *SBEIIb* proteins and/or activities.
4. The grain of any one of claims 1 to 3, wherein the proportion of amylose in the starch of the grain is at least 50%.
- 20 5. The grain of any one of claims 1 to 4 which comprises a transgene.
6. The grain of claim 5, wherein the transgene encodes an antisense, co-suppression, ribozyme or duplex RNA molecule.
- 25 7. The grain of any one of claims 1 to 4 which is non-transgenic.
8. The grain of any one of claims 2 to 7, further comprising a reduced level of *SBEI* protein and/or activity.
- 30 9. The grain of any one of claims 1 to 8, comprising an altered level of a protein and/or enzyme activity selected from the group consisting of ADP glucose pyrophosphorylase, GBSS, SSI, SSII, SSIII, a debranching enzyme of an isoamylase type and a debranching enzyme of a pullulanase type.
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10. The grain of claim 9, comprising an altered level of GBSS protein and/or enzyme activity.
11. The grain of any one of claims 1 to 10 which is non-shrunken.
12. The grain of any one of claims 1 to 11 which is brown rice having an average weight of at least about 25 mg.
13. The grain of any one of claims 1 to 12 wherein at least 50% of starch granules within the grain appear non-birefringent when observed under polarized light.
14. The grain of any one of claims 1 to 13 which has a starch content that is at least 90% of the starch content of equivalent, but unaltered, grain.
15. The grain of any one of claims 2 to 14, comprising a null mutation of the *SBEIIa* or *SBEIIb* gene.
16. The grain of any one of claims 1 to 15 which is of an Indica variety or which comprises a *Wx^a* allele.
17. A rice plant capable of producing the grain according to any one of claims 1 to 16.
18. Starch granules extracted from the grain according to any one of claims 1 to 16.
19. Starch extracted from the grain according to any one of claims 1 to 16.
20. A product comprising flour or starch produced from the grain according to any one of claims 1 to 16.
21. The product of claim 20 wherein the flour or starch is blended with flour or starch from another source.
22. The product of claim 20 which is a non-food product.
23. A composition comprising the starch of claim 19 and another food ingredient or water.

24. A method of producing a rice plant capable of producing grain, the grain having starch comprising at least 40% amylose, comprising the steps of
- a) introducing a genetic variation into a parent rice plant or seed; and
 - 5 b) identifying a progeny plant of the parent rice plant or seed, wherein the starch of grain of the progeny plant comprises at least 40% amylose.
25. The method of claim 24 wherein the progeny rice plant comprises two or more genetic variations, wherein one genetic variation is selected from the group consisting of
- 10 e) a mutation of an *SBEIIa* gene which inhibits SBEIIa expression and/or activity, and
 - f) an introduced nucleic acid which inhibits SBEIIa expression and/or activity, and
- and wherein a second genetic variation is selected from the group consisting of
- 15 g) a mutation of an *SBEIIb* gene which inhibits SBEIIb expression and/or activity, and
 - h) an introduced nucleic acid which inhibits SBEIIb expression and/or activity.
26. The method of claim 24 or 25 wherein the genetic variation leads to a reduction of the levels of SBEIIa and SBEIIb proteins and/or activities in the endosperm of the rice plant.
27. The method of any one of claims 24 to 27 wherein the step of introducing the genetic variation comprises introducing an exogenous nucleic acid.
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28. The method of claim 27 wherein the exogenous nucleic acid is introduced into a rice cell which is then regenerated into a rice plant.
29. The method of claim 28 wherein the exogenous nucleic acid encodes an inhibitor of SBEIIa and/or SBEIIb expression and/or activity.
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30. The method of claim 29 wherein the inhibitor is an antisense, co-suppression, ribozyme or duplex RNA molecule.
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31. The method of claim 24 or 25 wherein the step of introducing the genetic variation comprises mutagenesis of the parent rice plant or seed with a chemical agent or radiation.

32. The method of any one of claims 25 to 31, wherein the progeny rice plant comprises a null mutation in *SBEIIa* and/or *SBEIIb*.
- 5 33. The method of any one of claims 25 to 32 which further comprises the step of introducing a genetic variation which leads to a reduction in the level of SBEI protein and/or activity.
- 10 34. The method of claim 24 or 25 wherein the progeny plant is identified on the basis of the amylose level in the grain starch or on a reduction in the levels of *SBEIIa* and/or *SBEIIb* proteins and/or activities in the endosperm of the progeny plant.
- 15 35. The method of any one of claims 24 to 34 which further comprises the introduction of a *Wx^a* allele into the rice plant.
36. The method of claim 35 wherein the *Wx^a* allele is introduced by crossing.
- 20 37. A method of producing a rice plant having a reduced level of both *SBEIIa* and *SBEIIb* proteins and/or enzyme activities in the endosperm which comprises:
- a) mutagenising seed having a reduced level of *SBEIIa* protein and/or enzyme activity; or
 - b) mutagenising seed having a reduced level of *SBEIIb* protein and/or enzyme activity; or
 - 25 c) crossing a plant having a reduced level of *SBEIIa* protein and/or enzyme activity with a plant having a reduced level of *SBEIIb* protein and/or enzyme activity; and
 - d) identifying a rice plant having reduced activity of both *SBEIIa* and *SBEIIb* proteins and/or enzyme activities in the endosperm.
- 30 38. The method of claim 37 wherein the step of identifying the rice plant comprises screening a population of rice plants with a molecular marker that is linked to the *SBEIIa* gene or *SBEIIb* gene of rice, and identifying the plant on the basis of the presence or absence of a signal from the screening with the linked molecular marker.
- 35 39. The method of claim 37 wherein the step of identifying the rice plant comprises the step of screening seed from a population of rice plants with an antibody that binds the

SBEIIa protein or SBEIIb protein of rice, and identifying the plant on the basis of the presence or absence of antibody binding.

5 40. A method of producing altered rice starch comprising the step of extracting starch from the grain according to any one of claims 1 to 16.

10 41. Use of two or more exogenous nucleic acid molecules, at least one of which encodes an inhibitor of rice *SBEIIa* expression and/or activity and at least another of which encodes an inhibitor of rice *SBEIIb* expression and/or activity, to produce a rice plant which has reduced levels of SBEIIa and SBEIIb proteins and/or activities.

15 42. The use of claim 41 wherein the inhibitors are selected from the group consisting of antisense molecules, co-suppression molecules, ribozymes, duplex RNA molecules and any combination of these.

43. An isolated nucleic acid molecule which encodes an inhibitor of rice SBEIIa and an inhibitor of rice SBEIIb, which may be the same or different.

20 44. A vector which comprises the isolated nucleic acid molecule of claim 43.

45. A cell which comprises the isolated nucleic acid molecule of claim 43.

46. The cell of claim 45 which is a rice cell.

25 47. A transgenic rice plant comprising the isolated nucleic acid molecule of claim 43.